

CLAIMS

1. A water treatment system comprising:
a pressurized reservoir system fluidly connected to a point of entry;
5 a water treatment device fluidly connected to the pressurized reservoir system;
a water distribution system fluidly connected to the pressurized reservoir system; and
at least one point of use fluidly connected to the water distribution system.
2. The water treatment system of claim 1 further comprising a pretreatment system
10 fluidly connected upstream of the water treatment device.
3. The water treatment system of claim 2 wherein the pretreatment system comprises a reverse osmosis device.
- 15 4. The water treatment system of claim 3 wherein the pretreatment system further comprises a carbon filter.
5. The water treatment system of claim 4 further comprising at least one water property sensor.
20
6. The water treatment system of claim 5 wherein the water property sensor comprises any of a conductivity sensor, a flow rate sensor, a temperature sensor, pressure sensor, a pH sensor, a turbidity sensor, a composition analyzer and combinations thereof.
- 25 7. The water treatment system of claim 6 further comprising a controller for regulating an operating condition of the water treatment system based on a measurement of the water property sensor.
8. The water treatment system of claim 7 wherein the controller regulates at least one
30 of an applied current and an applied voltage to the water treatment device.
9. The water treatment system of claim 8 further comprising a remote communication device in communication with the controller.

10. The water treatment system of claim 9 wherein the point of use comprises an appliance.

5 11. The water treatment system of claim 7 further comprising an algorithm in the controller capable of calculating an LSI based on the measurement of the water property sensor.

10 12. The water treatment system of claim 1 wherein water in the water storage vessel comprises chlorine.

13. The water treatment system of claim 1 further comprising a heat exchanger thermally connected to the pressurized reservoir system.

15 14. The water treatment system of claim 1 further comprising at least one water property sensor.

20 15. The water treatment system of claim 1 further comprising a controller for regulating an operating condition of the water treatment system based on a measurement of a water property sensor.

16. The water treatment system of claim 1 further comprising an auxiliary use fluidly connected downstream of the water treatment device.

25 17. The water treatment system of claim 1 further comprising an irrigation system fluidly connected downstream of the water treatment device.

18. The water treatment system of claim 1 wherein the water distribution system is a household water distribution system.

30

19. The water treatment system of claim 1 wherein the treated water has a conductivity of less than about 220 $\mu\text{S}/\text{cm}$.

20. The water treatment systems of claim 1 wherein the water treatment device comprises an electrodeionization device.

21. A treatment system comprising:

a reservoir system fluidly connected to a point of entry;
an electrochemical device fluidly connected to the reservoir system;
a point of use fluidly connected to the reservoir system; and
an auxiliary use fluidly connected downstream of the electrochemical device.

22. The treatment system of claim 21 wherein the reservoir system is pressurized.

23. The treatment system of claim 21 further comprising a pretreatment system fluidly connected upstream of the electrochemical device.

24. The treatment system of claim 21 wherein the pretreatment system comprises a reverse osmosis device.

25. The treatment system of claim 23 wherein the pretreatment system comprises a carbon filter.

26. The treatment system of claim 21 further comprising a controller for regulating at least one operating parameter of the treatment system.

27. The treatment system of claim 21 wherein the point of use comprises an appliance.

28. The treatment system of claim 21 further comprising a heat exchanger thermally connected to the reservoir system.

29. The treatment system of claim 21 wherein the auxiliary use comprises an irrigation system.

30. A method for treating water comprising:
introducing water to a pressurized reservoir system;

transferring a portion of the water from the pressurized reservoir system to a water treatment device;

removing at least a portion of any undesirable species from the water from the pressurized reservoir system in the water treatment device to produce treated water;

5 transferring the treated water from the water treatment device to the pressurized reservoir system; and

 distributing a portion of the treated water from the pressurized reservoir system to a point of use.

10 31. The method of claim 30 wherein the undesirable species is a hardness ion species.

 32. The method of claim 30 further comprising pretreating the water before transferring the water to the water treatment device.

15 33. The method of claim 30 further comprising measuring any of a water turbidity, alkalinity, composition, conductivity, pH, pressure and temperature.

 34. The method of claim 30 further comprising adjusting at least one of an applied current and an applied voltage on the water treatment device.

20

 35. The method of claim 30 further comprising heating the water in the pressurized reservoir system.

 36. The method of claim 30 further comprising adjusting an operating cycle of the water
25 treatment device.

 37. The method of claim 30 wherein the water treatment device comprises an electrodeionization device.

30 38. The method of claim 30 further comprising cleaning the water treatment device to remove or inactivate at least a portion of any contaminant organisms.

39. The method of claim 38 wherein cleaning the water treatment device comprises exposing at least a portion of a wetted surface of the water treatment device to a cleaning agent.

5 40. A method for treating water comprising:
introducing water from a point of use to a reservoir system;
removing at least a portion of any undesirable species from the water in the reservoir system in an electrochemical device to produce treated water and discharge water;
transferring at least a portion of the treated water from the electrochemical device to
10 the reservoir system;
transferring a portion of the discharge water to an auxiliary use; and
distributing a portion of the treated water from the reservoir system to a point of use.

41. The method of claim 40 wherein the reservoir system is pressurized.

15 42. The method of claim 40 wherein distributing a portion of the treated water comprises distributing water to a household.

43. The method of claim 40 wherein transferring the discharge water to the auxiliary use
20 comprises transferring at least a portion of the discharge water to an irrigation system.

44. The method of claim 40 further comprising pretreating the water before removing the at least a portion of the any undesirable species from the water.

25 45. The method of claim 40 further comprising adjusting an operating parameter of the electrochemical device.

46. A water distribution system comprising:
a first pretreatment system fluidly connected to a point of entry;
30 a pressurized reservoir system fluidly connected downstream of the first pretreatment system;
a second pretreatment system fluidly connected to the pressurized reservoir system;
and

an electrochemical device fluidly connected downstream of the second pretreatment system and to the pressurized reservoir system.

47. The distribution system of claim 46 further comprising a controller for regulating at least one of an applied current and an applied voltage on the electrochemical device.

48. The distribution system of claim 46 further comprising a heat exchanger in thermal communication with the pressurized reservoir system.

49. The distribution system of claim 46 further comprising a fluid transfer system fluidly connected to the pressurized reservoir system and a point of use.

50. The distribution system of claim 49 further comprising a post treatment system fluidly connected downstream of the electrochemical device and upstream of a point of use.

51. A water treatment system comprising:
means for accumulating water from a water source at a pressure above atmospheric pressure; and
an electrochemical device fluidly connected to the means for accumulating water.

52. The system of claim 51 further comprising means for fluidly delivering a portion of the water to a point of use.

53. The system of claim 51 further comprising a pretreatment system fluidly connected upstream of the means for accumulating water.

54. The system of claim 51 further comprising a means for adjusting an operating parameter of at least one of the electrochemical device, the means for accumulating water and the means for fluidly delivering a portion of the water.

55. The system of claim 51 further comprising means for heating the water.

56. A method for treating water comprising:
mixing water from a point of entry with a treated water to produce a mixed water;
removing a portion of any undesirable species from a portion of the mixed water in
an electrochemical device to produce the treated water; and
5 distributing a portion of the mixed water to a point of use.

57. The method of claim 56 further comprising pre-treating at least a portion of the
mixed water.

10 58. The method of claim 56 further comprising adjusting at least one of a voltage and
current applied on the electrochemical device.

59. The method of claim 56 further comprising heating at least a portion of the mixed
water.

15 60. A method for treating water comprising:
accumulating water from a point of use;
removing at least a portion of any undesirable species from the water in an
electrochemical device to produce treated water; and
20 supplying at least a portion of the treated water to a household.

61. The method of claim 60 wherein the water from the point of use is accumulated
under a pressure that is above atmospheric pressure.

25 62. A method for treating water comprising:
accumulating water from a point of use at a pressure that is above atmospheric
pressure;
providing an electrochemical device;
transferring at least a portion of the accumulated water to the electrochemical device;
30 removing at least a portion of any undesirable species from the water in the
electrochemical device to produce a treated water; and
adjusting at least one operating parameter of the electrochemical device.

63. The method of claim 62 further comprising supplying at least a portion of the treated water to a household appliance.

64. The method of claim 63 further comprising heating at least a portion of the treated water prior to supplying the water to a household appliance.

65. The method of claim 62 further comprising calculating a desired property of the treated water.

66. The method of claim 62 further comprising reversing a polarity of an electric field applied across the electrochemical device.

67. The method of claim 62 further comprising adjusting a time delay between reversing cycles.

68. A system comprising:
a fluid reservoir in thermal communication with a heat exchanger; and
a fluid treatment device fluidly connected to the fluid reservoir.

69. The system of claim 71 wherein the fluid treatment device comprises at least one of an electrochemical device, a reverse osmosis device, an ion-exchange device, an electrodialysis device and a capacitive deionization device.

70. A method for facilitating water treatment comprising:

providing a system comprising a pressurizable reservoir system that is fluidly connectable to a point of entry and an electrochemical device fluidly connected to the pressurizable reservoir system and fluidly connectable to a water distribution system.